

SPECIFICATION

Docket No. 0417MH-26063

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN that I, JAN SCOTT ZWOLINSKI, a citizen of the United States of America, residing in the City of Graford, Texas, have invented new and useful improvements in a

METHOD AND APPARATUS FOR PROVIDING A HANDHELD  
SCANNER-DICTIONARY APPARATUS

of which the following is a specification:

<b>CERTIFICATE OF EXPRESS MAIL NO. EM077089772US</b>	
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" under 37 CFR § 1.10 on the date indicated below and is addressed to the Assistant Commissioner of Patents and Trademarks, Washington, D.C. 20231.	
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## BACKGROUND OF THE INVENTION

### 1. Cross-Reference to Related Application:

This application claims the benefit of U.S. Provisional Patent Application Serial No. 60/041,534; filed 25 March 1997, entitled *Method and Apparatus for Providing a Handheld Scanner-Dictionary Apparatus*.

### 2. Field of the Invention:

The present invention relates in general to portable electronic devices, and particularly to portable electronic devices which are useful for providing dictionary and/or translation functions for a reader.

### 3. Description of the Prior Art:

Readers frequently incur words in reading material which they do not fully understand. Their options are to utilize a conventional dictionary to look up the words, or a handheld keypad-type dictionary device in order to look up the words electronically. Both have their disadvantages. The conventional dictionary requires a reader to manipulate a relatively cumbersome device and locate the entry by turning pages. The electronic device requires the reader to directly key in the word for which he/she seeks a definition.

## SUMMARY OF THE INVENTION

It is one objective of the present invention to provide a portable handheld device which combines the functions of a scanner with a portable electronic dictionary device with an LCD or other display for displaying the definition of the word that has been scanned in with the device.

It is another objective of the present invention to provide the handheld scanner dictionary with an optional keypad operation which allows the user to physically manipulate a keypad or to utilize a stylus and a graphical user interface keypad in order to key in the word for which a definition is sought.

It is another objective of the present invention to provide a handheld scanner-dictionary which includes an alternative voice operation which utilizes a microphone and a speech-to-text module to receive a word as an input. The handheld scanner-dictionary will then retrieve the definition and either voice-announce the definition or display the definition in an LCD display, or a combination of voice-announce and display.

It is another objective of the present invention to combine the above-identified features of the handheld scanner-dictionary with a conventional pager.

It is another objective of the present invention to provide the above-identified handheld scanner-dictionary with a translation function which fetches a foreign language definition of a particular word that is input into the device.

It is yet another objective of the present invention to provide the above-identified handheld scanner-dictionary with conventional clock and alarm functions.

1                                    **BRIEF DESCRIPTION OF THE DRAWING**

2                    **Figure 1A** is a pictorial representation of one particular embodiment of the  
3 handheld scanner-dictionary of the present invention with a detachable keyboard.

4                    **Figure 1B** is a pictorial representation of a book.

5                    **Figure 1C** is a pictorial representation of an alternative embodiment of the  
6 handheld scanner-dictionary with an enlarged display area which allows the utilization of  
7 a graphical user interface touch screen keyboard input device.

8                    **Figure 2** is a block diagram representation of the preferred handheld scanner-  
9 dictionary of the present invention.

10                   **Figures 3A** and **3B** are flowchart representations of scanning operations  
11 utilizing the handheld scanner-dictionary of the present invention.

12                   **Figures 4A** and **4B** are flowchart representations of keypad input operations  
13 utilizing the improved handheld scanner-dictionary of the present invention.

14                   **Figures 5A** and **5B** are flowchart representations of voice input operations  
15 utilizing the handheld scanner-dictionary of the present invention.

16                   **Figure 6** is a flowchart representation of pager operations utilizing the  
17 handheld scanner-dictionary of the present invention.

18                   **Figure 7** is a flowchart representation of translation function operations  
19 utilizing the scanner-dictionary of the present invention.

1                    **Figure 8** is a flowchart representation of the clock and alarm functions  
2                    utilizing the handheld scanner-dictionary of the present invention.



1 definition is sought. In this mode of operation, a microphone and speech-to-text module  
2 is utilized to determine the input word for which a definition is sought.

3 Several alternative operations are also provided in the handheld scanner-  
4 dictionary, such as: a pager mode of operation, a translation mode of operation, and a  
5 clock/alarm mode of operation. These modes of operation and functions will now be  
6 described with reference to the figures.

7 **Figure 1A** is a pictorial representation of one embodiment of the handheld  
8 scanner-dictionary **11** of the present invention. As is shown, the handheld scanner-  
9 dictionary **11** includes a tapered end **13** which terminates at a scanner input **17**, and an  
10 elongated rectangular portion **15** with user input buttons **19**, display **21**, and audio output  
11 device **20**. In the view of **Figure 1A**, display **21** is shown as displaying an input word **31**  
12 and associated definition **33**. Also, as is shown in **Figure 1A**, a detachable keyboard **23**,  
13 which includes individually operable keys **25**, is electrically connected to handheld  
14 scanner-dictionary **11**. The word for which a definition is sought may be input through  
15 either scanner **17** or detachable keyboard **23**. Audio output device **20** may serve a dual  
16 function: it may serve as a microphone, and it may serve as a speaker. When audio  
17 output device **20** serves as a microphone, the handheld scanner-dictionary **11** may be  
18 operated in a voice-input mode of operation wherein the user announces a word as an  
19 input to the handheld scanner-dictionary, and the handheld scanner-dictionary **11** utilizes  
20 speech-to-text conversion to generate the word, and then look up the definition of the  
21 word and either display it or generate an audio output of the definition.

22 **Figure 1B** is a pictorial representation of book **27**. As is shown, book **27**  
23 includes textual material, including the word "port". In accordance with the present  
24 invention, the handheld scanner-dictionary **11** may be utilized to scan in the word "port"

29 and generate a definition either in display 21 or as an output from audio output device 20.

Figure 1C depicts an alternative embodiment of the handheld scanner-dictionary 41, wherein tapered end 43 terminates at scanning input 47 and body section 45 is larger than in the previous embodiment in order to accommodate a larger display 49 which may be utilized to present a graphical user interface, touch screen display of a keypad. Graphical user interface display 51 displays the characters which may be selected through utilization of stylus 53 in a conventional manner.

Figure 2 is a block diagram representation of the components which make up handheld scanner-dictionary 11, 41 of Figures 1A and 1C. The handheld scanner-dictionary includes a central processing unit 101 and associated power circuit 119, clock circuit 121, ROM 103, and RAM 105, as is conventional. CPU 101 is also communicatively coupled to infrared receiver/transmitter 117 which may be utilized in a conventional manner to communicate through an infrared link to a desktop or laptop computer in order to exchange data. Optical reader circuit 107 is provided, which provides its output to signal processing circuit 109. Characters may be scanned utilizing the optical reader circuit 107. The signal is processed at signal processing circuit 109 and provided to central processing unit 101. CPU 101 is also connected to microphone 113 through signal processing circuit 115. In the voice-input mode of operation, microphone 113 is utilized to detect voice-enunciated words. Signal processing circuit 115 utilizes a conventional speech-to-text system to generate a textual word from the detected voice input, and provide that textual word to CPU 101. CPU 101 is also connected to operator input 123 which includes a number of dedicated buttons for commanding and controlling the handheld scanner-dictionary. Such buttons include "On" button 125, "Off" button 127, "Scroll Up" button 129, "Scroll Down" button 131, "Audio On" button 133, and any other conventional or novel command buttons that are desired. CPU 101 is also con-



1 nected to audio driver **135** which drives audio output device **137**. When the operator  
2 selects the "Audio On" button, CPU **101** will generate signals which actuate audio driver  
3 **135** to energize audio output device **137** to provide a voice definition for the particular  
4 word selected. CPU **101** is also connected to LCD display **139** which provides a display  
5 of the definition of the word received as an input at the handheld scanner-dictionary  
6 device. A touch screen function **141** is provided in order to allow a stylus to be utilized  
7 to interact with a graphical user interface in order to key in the characters which make  
8 up an input word. Alternatively, CPU **101** is connected to detachable keypad **111** which  
9 may be utilized for typing in the input word. As is discussed above, the handheld  
10 scanner-dictionary of the present invention may be utilized in combination with a pager.  
11 In this particular function, an RF receiver **143** is provided which communicates with  
12 paging circuit **145** which is communicatively coupled to CPU **101**. The pager operates  
13 in a conventional manner.

14 **Figures 3A and 3B** are flowchart representations of the scanning input mode  
15 of operation of the handheld scanner-dictionary of the present invention. The process  
16 begins at software block **201** and continues at software block **203**, wherein operator  
17 input is monitored. In accordance with software blocks **205** and **209**, the handheld  
18 scanner-dictionary monitors to determine whether the operator has turned the device on,  
19 and whether the operator has selected the audio output mode of operation. If the device  
20 is turned on, the power-up device software module **207** is activated. If the audio output  
21 is selected, the software module of activate audio **211** is activated. In accordance with  
22 software block **213**, the handheld scanner-dictionary monitors operator input to determine  
23 whether a wand operation has commenced. In other words, the handheld scanner-  
24 dictionary determines whether a scanning operation has commenced. Once the scanning  
25 operation has been detected, the optical reader is activated in accordance with software  
26 block **215**, the text is processed in accordance with software block **217**, the text is  
27 passed to the CPU **101** in accordance with software block **219**, and CPU **101** fetches the

1 definition from ROM in accordance with software block 221. Next, in accordance with  
2 software block 223, the handheld scanner-dictionary generates an audio driver signal and  
3 an LCD display signal. In accordance with software block 225, these signals are pushed  
4 to the audio output device and to the LCD display. Then, in accordance with software  
5 blocks 227, 231, the handheld scanner-dictionary monitors operator input to determine  
6 whether scrolling operations have been requested. Additionally, the handheld scanner-  
7 dictionary monitors to determine whether a repeat of the definition has been requested.  
8 If those functions are requested, scrolling is performed in accordance with software block  
9 229, and repeat of the audio messages is generated in accordance with software block  
10 233. Finally, in accordance with software block 235, the process ends.

11       **Figures 4A and 4B** are flowchart representations of the keypad mode of  
12 operation. The process begins at software block 251 and continues at software block  
13 253, wherein the handheld scanner-dictionary monitors for operator input. In accordance  
14 with software blocks 255, 257, 259, and 261, the handheld scanner-dictionary monitors  
15 for operator input, for powering up the device, and for activation of the audio output  
16 mode of operation. Then, in accordance with software block 263, the handheld scanner-  
17 dictionary monitors for operator selection of the keypad input. Then, in accordance with  
18 software block 265, the handheld scanner-dictionary monitors to determine whether the  
19 detachable keypad is connected. If the detachable keypad is not connected, control  
20 passes to software block 267, wherein the handheld scanner-dictionary generates a  
21 graphical user interface keypad and activates the touch-screen function in order to allow  
22 the operator to utilize a stylus (or, alternatively, his/her finger) in order to select  
23 characters as an input to the handheld scanner-dictionary. Next, in accordance with  
24 software blocks 269, 271, and 273, the CPU fetches the definition of the word from  
25 ROM, generates an audio driver signal and an LCD display signal, and pushes these  
26 signals to the audio output and to the LCD display grid. Then, in accordance with soft-  
27 ware blocks 275, 277, 279, and 281, the handheld scanner-dictionary monitors for

operator selection of the scrolling function or repeating of the audio output of the definition of the input text. Then, the process ends at software block 283.

Figures 5A and 5B are flowchart representations of the voice-input mode of operation. The process begins at software block 301 and continues at software blocks 303, 305, 307, 309, and 311, wherein the handheld scanner dictionary monitors operator input and determines whether the operator has activated the handheld scanner-dictionary, and selected the audio output mode of operation. Then, in accordance with software block 313, the handheld scanner-dictionary monitors to determine whether the operator has selected a voice-input mode of operation. If so, the process continues at software block 315, wherein the handheld scanner-dictionary activates the microphone function. Next, in accordance with software block 317, the handheld scanner-dictionary processes the audio input and, in accordance with software block 319, fetches the definition of the input word from ROM. Then, in accordance with software block 321, the handheld scanner-dictionary generates an audio driver signal and an LCD display signal which is pushed to the audio output and LCD display in accordance with software block 323. Finally, in accordance with software blocks 325, 327, 329, and 331, the handheld scanner-dictionary monitors to determine whether the operator has selected the scrolling mode of operation or if the operator has requested a repeat playing of the audio output of the word definition. The process ends at software block 333.

Figure 6 is a flowchart representation of the pager operation of the handheld scanner-dictionary in accordance with the present invention. The process begins at software block 351 and continues at software block 353, wherein the handheld scanner-dictionary monitors the radio frequency receiver. In accordance with software block 355, the handheld scanner-dictionary determines whether a page has been received. If so, control passes to software block 357, wherein the received page is compared to the pager ID. In accordance with software block 359, the handheld scanner-dictionary

1 compares the two to determine whether a match occurs. If a match occurs, control  
2 passes to software **363**, wherein the CPU is alerted to the incoming page. Then, in  
3 accordance with software block **365**, the CPU generates an audio response and an LCD  
4 display of the page information, as is conventional. In accordance with software block  
5 **367**, the handheld scanner-dictionary announces the page utilizing the audio response and  
6 LCD display, and the process ends at software block **369**.

7 **Figure 7** is a flowchart representation of the translation function of the  
8 handheld scanner-dictionary of the present invention. The process commences at  
9 software block **401** and continues at software block **403**, wherein the handheld scanner-  
10 dictionary is provided with a search word. This search word may be received via the  
11 scanning input, the keyboard input, or the audio input, as discussed above. In  
12 accordance with software block **405**, the handheld scanner dictionary determines whether  
13 the translation function has been requested. If so, control passes to software block **407**,  
14 wherein the language options are announced or displayed. Then, in accordance with soft-  
15 ware block **409**, the handheld scanner-dictionary monitors for the language selection. In  
16 this manner, a handheld scanner-dictionary may be programmed to provide translations  
17 into several different languages. In accordance with software block **411**, an audio  
18 response and display is generated which provides the foreign language translation in both  
19 human-perceptible text in the display and human-perceptible audio output from the audio  
20 output device. The process ends at software block **413**.

21 **Figure 8** is a flowchart representation of the clock/alarm function of the  
22 handheld scanner-dictionary of the present invention. The process begins at software  
23 block **415**, commences at software block **417** wherein the handheld scanner-dictionary  
24 determines the clock/alarm has been selected. As is conventional with clock/alarm  
25 devices, user is presented with a variety of options, including setting the clock in  
26 accordance with software blocks **419**, **421**, setting the alarm in accordance with

- 1 software blocks **423**, **425**, and displaying the clock according to software blocks **427**,
- 2 **429**. The process ends at software block **431**.

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